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Debilitating Effects of Anxiety on Engineering Students' Language Performances

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Abstract: Inconsistencies of results of foreign language anxiety's effect on advanced learners' language performances have persisted over the years. And little has been known on the relationship between foreign language anxiety and engineering graduate students' language performances. To fill the gap, this study employed a self-report anxiety scale called Foreign Language Classroom Anxiety Scale among forty six engineering graduate students of international programs at King Mongkut's University of Technology Thonburi (KMUTT) enrolled in LNG 601, a foundation English writing course for graduate students of international programs, during the summer of 2017. In addition, students' scores in presentations, group discussions, final exams, and course grades were collated. Using SPSS, correlational relationships between English language anxiety (herein referred to as fla) and language performances were computed. Findings revealed consistently negative and significant relationships between fla and individual presentation (r=-.45, p<.01), fla and group discussion (r=-.55, p<.01), fla and final exam (r=-.92, p<.01), and fla and course grade (r=-.41, p<.05). As the relationships are negative, this paper concludes with practical implications based on four fla factors that bear non-significant relationships with language performances on how to decrease the anxiety experiences of engineering graduate students in the English classroom.

Keywords: Correlational relationship, *Fla* and Language performances

Introduction

It is unavoidable that language learners may have feelings of tension, apprehension, nervousness and worry triggered in the process learning or using another tongue. For example, one of the participants in Humphries (2011) explained, "When speaking the target language, I could get so nervous I would forget things I knew". Other known sources of anxiety in English language classroom include answering questions (Liu [27]), disability in language processing (Sparks & Ganschow [43]), fear of losing face (Jones [22]), lack of practice (Lightbown & Spada [25]), limited grammatical knowledge (Dewaele & Tsui [9], Liu [27]), negative evaluation (Al-Saraj [2], Ay [5], Tóth [48]), misusing words (Tum, 2012), self-perceived poor pronunciations (Elkhafaifi [12]), teacher's feedback (Mak [32]), unwillingness to communicate (Liu & Jackson [28]), among others.

Horwitz and colleagues [16-17-18] called these subjective affections as *foreign* language anxiety (fla). Other researchers defined it as the subjective feeling of tension, apprehension, nervousness, and worry associated with an arousal of the autonomic nervous system (Spielberger [44]) as well as the "the feeling of tension and apprehension specifically associated with second language contexts, including speaking, listening, and learning" (Gardner and MacIntyre [31]). Based on the definitions above, *fla* can be labelled as psychological construct that can happen at any time in a particular setting.

Prior to the conception of *fla* in 1986, Kleinmann [24] proposed two separate constructs of language anxiety: facilitating and debilitating. Facilitating anxiety is described as positive, which may result into the student becoming even more motivated and in putting more effort in language learning (Zhang [55]). Young [53] explained that facilitating anxiety (is a rise in drive level) leads to improvement of performance. An example of facilitative anxiety might be students who accept risk as part of their language acquisition process; thus, anxiety motivates the students to learn more about the foreign language (Chastain, 1975; Frantzen & Magnan, 2005; Gardner & MacIntyre [31]; Gregersen, 2003; Gregersen & Horwitz, 2002; Oxford & Ehrman, 1995; Spielmann & Radnofsky, 2001 as cited in Marcos-Llinas and Garau [33-34]). By contrast, debilitative anxiety demotivates learners' language learning process (Zhang [55]). Learners who suffer from debilitative anxiety may have feelings of fear or insecurity and even suffer from poor performance and withdrawal from the foreign language class (Gardner, 1985; MacIntyre & Gardner [30]; Steinberg & Horwitz [17-18] as cited in Marcos-Llinas and Garau [33-34]).

Research has shown that several factors contribute to the foreign language classroom anxiety. Horwitz et al. [17-18] theorized that fla is associated with performance anxieties. These are communication apprehension (a type of shyness characterized by fear of or anxiety about communicating with people); test anxiety (a type of performance anxiety stemming from a fear of failure); and fear of negative evaluation (apprehension about others' evaluations, avoidance of evaluative situations and expectations that others would evaluate oneself negatively). Using factor analysis, Mak [32] identified five factors contributing to speaking-in-class anxiety among Hong Kong students including speech anxiety and fear of negative evaluation; uncomfortableness when speaking with native speakers; negative attitudes towards the English classroom; negative self-evaluation; and fear of failing the class/ consequences of personal failure. In this study, the participants reported that speaking in front of class without preparation, being corrected when speaking, inadequate wait-time and not being allowed to use the first language in a language class were also important factors causing speaking-in-class anxiety. Wilang & Singhasiri's (2017a) revealed that language anxiety is provoked by linguistic-related specific anxiety situations consisted of accentedness of speech, linguistic knowledge of the participants and speech rate; and, nonlinguistic-related specific anxiety situations were composed of the interlocutor's ability to express, attitudes, familiarity of other interlocutors, fear of negative evaluation, knowledge of topic, among others. In addition, the finding also indicated that several extra-linguistic factors were also categorized under participants' ability, attitudes, familiarity with other interlocutors, fear of negative evaluation, knowledge of the topic, proficiency of the interlocutor, voice projection, and willingness to communicate.

After the inception of *fla*, anxiety was found to negatively affect many specific aspects of language learning process, for example, listening (Golchi, 2012, Elkhafaifi [12]), speaking (Phillips [40], Suleimenova [45]), writing (Susoy and Tanyer [46], Tsiriotakis et al., 2017) and reading (Zhao, Dynia and Guo [56]).

Needless to say, *fla* is an important area of research because "it may affect the success of an individual's communication or willingness to communicate" (Young [54]) and because it also affects a large number of students in universities (Campbell & Ortiz [6]). However, little research has been conducted on *fla* of advanced learners, specifically, Thai EFL engineering students.

Due to its nature, it is predicted that *fla* might have negative effects on advanced engineering graduates' academic performance. The purpose of this study is to investigate anxiety levels of engineering graduate students, experienced in-class group discussion and presentation and to find out whether there is any significant correlation between students' anxiety and their academic performances regarding group discussion scores, presentation scores, final exam scores and course grades. Two research questions are sought to be

answered: (1) What is the level of foreign language anxiety among Thai graduate engineering students? (2) Is there any relationship between students' anxiety and language performance?

1. Background of the study

As discussed above, anxiety poses several potential problems for the students of a foreign language because of its high probability to interfere with the acquisition, retention and production of the new language (MacIntyre and Gardner [30]). It has been widely documented that anxiety reactions act as an invisible fence of the language learner's ability to successfully perform in a foreign language class (Horwitz et al. [17-18].

1.1 Effects of fla on academic performance

Apart from social and emotional negative effects of *fla*, it is not surprising that it has debilitative effects on the learner's academic performance. According to Young [54], 50 percent of learners taking language classes suffer debilitating anxiety. Subsequent studies have revealed significant negative relationships between learners' anxiety measures and their academic success. Awan et al. [4] found that language anxiety and achievement are negatively related to each other. Demirdaş and Bozdoğan's [8] findings indicated that there was a statistically significant negative relationship between foreign language anxiety and language performance.

However, Marcos-Llinás and Garau [33-34] concluded that there was a medium level of language anxiety among most participants, but did not find any significant effect on course achievement. In addition, some studies showed that language anxiety can be the best predictors of language achievement such as Aida [1], Saito and Samimy [42], Onwuegbuzie et al. [38].

Such findings have shown conflicting effects with regards to correlations between language anxiety and academic achievement, and of course further research is more than ever needed in order to somewhat fill in the gap in this field of study.

1.2 Inconsistent results of fla's effect

According to Kleinmann [24], students with high levels of debilitating anxiety attempted various types of grammatical constructions than did less anxious ESL students. The more anxious student tends to avoid attempting difficult or personal messages in the target language (Horwitz et al. [17-18]). Until recently, the debilitating effects of *fla* have been challenging to demonstrate that there are inconsistencies of results on its effects particularly in engineering advanced learners.

Horwitz and Young's [54] study also revealed that approximately half the students taking language courses experience debilitating anxiety. Some research studies showed that learners at beginning levels appeared to obtain higher levels of anxiety than advanced learners (Gardner et al. [14], Kitano [23], Ewald [13], Llinas and Garau [33-34]). However, it did not guarantee that these students obtained lower final course grades than beginners. In such a case, language anxiety may not have debilitating but facilitating effects on learners at more advanced levels. Saito and Samimy's [42] results indicated that for beginning students, the Year in College was identified as the best predicting factor, while Language Classroom Anxiety was the best predictor for both intermediate-and advanced-level students. Moreover, Debreli and Demirkan [7] found that students with a higher level of language proficiency had a higher level of anxiety compared with the students with a lower

level of language proficiency. Similarly, Alaldi [10-11], who investigated foreign language anxiety of students studying English language and literature, found that although the students' anxiety was found at moderate level both in preparatory class (low proficiency levels) and in fourth grade (more advanced levels), students experienced higher anxiety level in fourth grade than they did when they were in preparatory class.

However, some studies showed opposing evidence to the above mentioned findings. Liu [26] investigated anxiety in Chinese EFL students at three different proficiency levels, but found no significant difference in anxiety among three groups. Correspondingly, a study conducted by Pichette [41] revealed non-significant difference in anxiety between two groups of students at different proficiency levels. In addition, Alsowat [3], who studied foreign language anxiety level and the factors affecting the anxiety among Saudi English major students in higher education, reported that although the students experienced the same amount of anxiety, their academic level did not affect their anxiety.

It is obvious that there are inconsistencies in previous findings on foreign language anxiety's effect on learners at various proficiency levels. Thus, this area is in need of further future research. Most of previous research studies have focused on learners at lower or intermediate level. Recently, research on anxiety at more advanced levels has received much attention, but only few studies have been done regarding this focus (Tóth [48], Marzec-Stawiarska [35-36], Alsowat [3]). In addition, it is surprising to find relatively little research which has investigated foreign language anxiety of engineering students at advanced levels in Thai EFL setting, and this finding led to the investigation of the present study.

In order to fill in the gap of previous studies, the present study aims at examining engineering advanced students' anxiety levels and exploring the relationship between foreign language anxiety and language performances focusing on speaking, specifically on individual presentations and group discussions; and, general language performances such as final exams and course grades. By establishing relationship between the above variables, appropriate measures will be discussed to facilitate the acquisition, retention or production (MacIntyre and Gardner [30]) of English language.

2. The present study

2.1 Participants

The participants were 46 first-year graduate students of engineering international programs at King Mongkut's University of Technology Thonburi. The students were enrolled in LNG 601, a foundation English writing course for students of international programs in the summer of the academic year 2017. Upon the approval of the Research and Ethics committee, consent forms on participation and data collection were distributed to the students. Out of 46 enrollees, only 36 consented to participate and to use their data for the present study. In the preliminary analysis of data, one student was excluded due to missing values in the survey form. In total, the data from 35 students were reported in this paper.

2.2 Research instruments and data collection

In order to answer the first research question, we administered a 33-item FLCAS adapted from Mak [32] to two groups of advanced engineering students to find out their level of foreign language anxiety in general. We found that using Mak's FLCAS is highly relevant to the context of our study. In Mak's FLCAS, five underlying constructs were established such as Speech anxiety and fear of negative evaluation, Uncomfortableness when speaking

with native speakers, negative attitudes towards the English classrooms, Negative self-evaluation, and Fear of failure / consequences of personal failure. A four-point scale was also adapted to elicit more precise answers from the students. In addition, only English version of the scale was used as enrollees in the engineering international programs are presumed to have higher level of English proficiency.

In order to answer the second research question, the participants' academic records including presentation scores, group discussion scores, final exam scores, and course grades of LNG 601 were collected from their respective lecturers at the end of the course.

2.3 Data analysis

The quantitative data obtained from the FLCAS was analyzed to identify participants' anxiety levels of anxiety. Inferential statistics was used to calculate relationships between anxiety and performance variables.

3. Results and Discussion

This paper reports only the descriptive and correlational results of a larger study on the anxiety experiences of engineering graduate students at King Mongkut's University of Technology Thonburi. The first part contains the mean of scores and percentages of the students' self-report on anxiety, presentation scores, group discussion scores, final exam scores, and course grades. The second part details the correlational relationships of variables including anxiety, anxiety's four underlying structures and language performances.

3.1 Descriptive data

Table 1 reveals the means of scores of the students with regard to their anxiety, presentation scores, group discussion scores, final exam scores, and course grades. For anxiety scores, 20 students reported higher anxiety above the mean (M=63.54). It means that majority of engineering students who were taking the course experienced more anxiety than the rest of their peers. In fact, out of 15 students who indicated lower anxiety, nine students' means of scores ranged from 60 to 63 which are very close to M=63.54. Thus, only six out of 35 students were considered as slightly anxious. Concerning the presentation and group discussion scores, the findings suggest that the students performed well since the means of scores are close to 10, the full scores. Regarding final exam scores, results suggested moderate scores, not very low (M=12.70) and not very high (M=27.60). Finally, in course grades, all students gained satisfactory marks since the passing score is 65.

Table 1. Summation of scores

	N	Min	Max	Mean	S.D.
Anxiety scores	35	43.00	75.00	63.54	7.53
Presentation scores	35	8.00	9.80	9.17	0.53
Group discussion scores	35	8.00	9.50	8.83	0.47
Final exam scores	35	12.70	27.60	21.08	3.91
Course grades	35	69.00	93.00	82.13	6.09

3.2 Correlations of fla and performance variables

Correlational relationships between foreign language anxiety and performance variables were found to be negative and significant such as fla and group presentation (r=-.45, p<.01), fla and group discussion (r=-.55, p<.01), fla and final exam (r=-.92, p<.01), and fla and final grade (r=-.41, p<.05). It means that students who feel higher anxiety will get lower scores in group presentation, group discussion, final exam, and course grades.

This finding is in line with the findings of several previous studies such as Horwitz [17-18]; MacIntyre & Gardner [29], Saito & Samimy [42], Tallon [47], Awan et al.[4], Wang, 2011; Demirdaş and Bozdoğan [8], in which language anxiety was found to have statistically significant negative association with language performance. It is apparent that foreign language anxiety can be debilitative. Young (1999) stated that the higher the anxiety level is, the higher it hinders learners' performance. In other words, foreign language anxiety undermines students' language proficiency and leads to poor levels of their performances. One possible explanation might be that high-anxious students can be discouraged, lose faith in their abilities, and give up the effort in learning a language well (Na [37]). Moreover, their communication strategies in class can be affected by anxiety, in that they may tend not to attempt any challenging and personal messages in the target language. Therefore, that students with high levels of anxiety getting lower achievement is not a surprise.

Further computations of the correlational relationships among the performance variables (see Table 2) indicate positive and significant relationships, for examples, group presentation and group discussion (r=.64, p<.01), group presentation and final exam (r=.66, p<.01), group presentation and final grade (r=.72, p<.01), group discussion and final exam (r=.44, p<.01), group discussion and final grade (r=.55, p<.01), and final exam and final grade (r=.92, p<.01). The findings show that the final grade increases when the students get higher scores in group presentation, group discussion and final exam.

It is interesting that the scores of students' performances are still high such as presentation scores (mean=9.17 out of 10), group discussion scores (mean=8.83 out of 10), and final exam scores (mean=21.08 out of 30) although they are reported to have lower scores negatively associated with their level of anxiety. This might be due to the distribution of scores in LNG601. In this course, group discussion and presentation scores account for 10% each while final exam scores account for 30% of the course evaluation and assessment. To clarify, students are already aware of the importance of the assigned tasks that can affect their final grades. Thus, more efforts and attempts may have been put into group presentation, group discussion and final exam. Another possible reason might be that students taking LNG106 must obtain a certain level of English proficiency which is estimated to be at advanced level. They might have more positive attitudes towards and motivations for foreign language learning. As a result, they gain an increase in their final grades.

Table 2. Correlations of *fla* and performance variables

	General classroom anxiety	Group presentation	Group discussion	Final exam	Final grade
General classroom anxiety	-				
Group presentation	45**	-			
Group discussion	55**	.64**	-		
Final exam	92**	.66**	.44**	-	
Final grade	41*	.72**	.55**	.92**	-

3.3 Correlations of fla, its underlying constructs and performance variables

All the underlying constructs of foreign language anxiety are positive and significantly correlated with general class anxiety (see Table 3) including speech anxiety and fla (r=.96, p<.01), uncomfortableness and fla (r=.57, p<.01), negative self-attitude (r=.48, p<.01), and fear of failure and fla (r=.54, p<.01) except for negative attitude and fla (r=.31, n.s.). Although the relationships of all underlying constructs and performance variables were all negative, it is interesting to point out the negative and significant relationships between speech anxiety and group presentation (r=-.42, p<.05), speech anxiety and final exam (r=-.45, p<.01), speech anxiety and final grade (r=-.45, p<.01), negative attitude and group presentation (r=-.38, p<.05), and negative self-attitude and group presentation (r=-.33, p<.05).

Table 3. Correlations of *fla*, its underlying constructs and underlying variables

	General classroom anxiety	Group presentation	Group discussion	Final exam	Final grade
Speech anxiety	.96**	42*	29	45**	45**
Uncomfortableness	.57**	15	.09	16	15
Negative attitude	.31	38*	21	25	15
Negative self-attitude	.48**	33*	29	12	20
Fear of failure	.54**	14	11	-11	024

It can be seen that speech anxiety is one of the most important factors contributing to *fla* identified in the present study. In other words, speech anxiety has the largest variance in the FLCAS. This finding is consistent with Mak's [32] study, in which speech anxiety and fear of negative evaluation accounted for 20.4% of the variance. In addition, comfortableness

and negative self-attitude can affect group presentation due to the fact that students were asked to present in front of the class unlike group discussion where students were seated. However, it is found that there was no significant correlation between negative attitudes and *fla*. This finding is inconsistent with Mak's conclusion [32], in that negative attitudes can affect oral performance and grades when meeting compulsory requirements to speak and contribute to role-plays and discussion in a positive manner.

On the one hand, the finding of the present study shows that there are negative significant relationships between speech anxiety and group presentation, speech anxiety and final exam, speech anxiety and final grade, negative attitude and group presentation, and negative self-attitude and group presentation. Also, the statistical result indicates that negative but non-significant correlation was found between the four factors and group discussion, final exam, and final grades. This can be explained by the fact that students' achievement can be influenced by other factors such as students' self-confidence, individual differences, and their level of English proficiency. Self-motivation might also be a possible factor due to the fact that LNG601 is a compulsory course in order for them to proceed with their next steps of learning. Once they fail the course, they might not have time to re-sit the class. On the other hand, the interesting finding in this study is that among the four factors, only comfortableness was found to be positively correlated with group discussion scores. The positive but non-significant relationship of comfortableness with group discussion could be the result of students feeling more comfortable discussing with their classmates. Similar to this finding, the participants in Liu [26] and Young [54] acknowledged that they did not feel nervous during pair work or group work.

4. Conclusion and implications for teachers

This study aimed to investigate anxiety levels of KMUTT engineering graduate students triggered in in-class group discussion and presentation and to find out if there is any significant correlation between students' anxiety and their academic performance. Based on the results of the study, *fla* levels of engineering advanced students were generally found to have negative and significant association with their individual presentation, group discussion, final exam and course grade. However, regarding factor relationships with language performances, some significant associations have been found in this study. As the study found that anxiety has debilitating effects to the students' language performances, it is crucial for English language teachers or teachers who use English to teach other subjects to find ways to decrease such unpleasant feelings in the classroom. Perhaps, the four non-significant underlying constructs could help guide teachers to come up with anxiety reduction strategies.

Some implications can be drawn from the results. Language teachers should establish good rapport with students. Building up rapport with learners is essential for a teacher to teach successfully because rapport enhances learning, motivates learners and reduces learners' anxiety (Jiang and Ramsay [21]). Teachers can facilitate creating a positive learning environment such as incorporating multimedia technology in classroom, as suggested by Huang and Hwang [20] that a multimedia environment can reduce student anxiety and provide a less stressful classroom environment and multimedia tools enable English teachers to help students to both improve their English performance and lower their language anxiety. In addition, student-talk and delayed feedback should be encouraged to decrease students' anxiety. By doing this, students will not worry about activities' time constraint in class and feeling like they are "losing face" due to negative feedback from the teacher. Thus, language teachers should not ignore that positive reinforcement and constructive feedback should be given in order to enhance students' learning development

in language classroom. Just as importantly, to increase the possibility of comfortableness in classroom, group work activities can be incorporated into students' learning process. Some might be nervous at the beginning because they are not familiar with each other yet, but very soon when they realize they are in the same boat, they may feel more comfortable and less nervous having discussions in their group.

The present study was conducted with a limited numbers of participants, which might not permit generalization. Therefore, future research in this subject should be conducted with a larger sample size and various range of data. This study can also be expanded to other universities for generalization of the findings in the Thailand context. Future studies should investigate the teaching strategies in classroom in order to obtain the highly rated sources of *fla*. Language teachers should be aware of classroom provoking-anxiety situations and deal with those situations so that they can help students get the highest benefit from their process of language learning. Other variables that may contribute to *fla* such as teacher's manner and assessment procedure should be explored as well for a better understanding of *fla*.

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